

This Listing of Claims will replace all prior versions, and listings, of claims in this application:

**Listing of Claims:**

1. (Currently amended) An isolated polynucleotide molecule comprising:
  - (a) a nucleic acid molecule encoding an aspartate kinase (ask) polypeptide;
  - (b) a nucleic acid molecule encoding an aspartate-semialdehyde dehydrogenase (asd) polypeptide; ~~and~~
  - (c) a nucleic acid molecule encoding a dihydrodipicolinate reductase polypeptide; and
  - (d) a nucleic acid molecule encoding a diaminopimelate dehydrogenase (ddh)

~~wherein said polynucleotide molecule does not comprise a nucleic acid molecule encoding any one of dihydrodipicolinate synthase, tetrahydrodipicolinate succinylase, N-succinylaminoketopimelate transaminase, N-succinyl-diaminopimelate desuccinylase, or diaminopimelate epimerase.~~
2. (Currently amended) The polynucleotide molecule of claim 1, wherein said polynucleotide molecule ~~additionally~~ comprises a nucleic acid encoding a complete or truncated diaminopimelate dehydrogenase (ddh) polypeptide, wherein said truncated ddh polypeptide has at least 80% identity to SEQ ID NO: 8 and has diaminopimelate dehydrogenase activity.
3. (Currently amended) The polynucleotide molecule of claim 2, wherein said polynucleotide molecule additionally comprises a nucleic acid encoding a complete or truncated ORF2 polypeptide, wherein said complete ORF2 polypeptide ~~has thymidilate synthase or 2,3~~

~~dihydrodipicolinate N-C6-lyase activity and of SEQ ID NO:9~~ is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 9, and wherein said truncated ORF2 polypeptide has a length, measured in total number of amino acids, of at least 25% of the full length of an ORF2 polypeptide, and wherein said ORF2 polypeptide increases lysine synthesis.

4. (Currently amended) ~~The polynucleotide molecule of claim 1, wherein said polynucleotide molecule comprises optionally a nucleic acid encoding complete or truncated ddh, optionally complete or truncated ORF2, and complete or truncated diaminopimelate decarboxylase polypeptides, wherein said truncated ddh polypeptide has at least 80% identity to SEQ ID No: 8, wherein said truncated ORF2 polypeptide has a length, measured in total number of amino acids, of at least 25% of the full length of an ORF2 polypeptide of SEQ ID NO: 10, wherein said complete ORF2 polypeptide has thymidilate synthase or 2,3 dihydrodipicolinate N-C6-lyase activity and is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 9, and wherein said truncated diaminopimelate decarboxylase polypeptide has at least 80% identity to a diaminopimelate decarboxylase polypeptide of SEQ ID NO: 12.~~

The polynucleotide molecule of Claim 1 wherein said polynucleotide molecule further comprises a nucleic acid encoding:

(a) a complete or truncated diaminopimelate decarboxylase (lysA) polypeptide of SEQ ID NO:12 having diaminopimelate decarboxylase activity; and optionally

(b) a diaminopimelate dehydrogenase (ddh) polypeptide of SEQ ID NO: 8 wherein said ddh polypeptide is complete or truncated, wherein said truncated polypeptide has at least 80% sequence identity to SEQ ID NO:8 and has ddh activity; and optionally

(c) an ORF2 polypeptide of SEQ ID NO:10, wherein said ORF2 polypeptide is complete or truncated, wherein said truncated ORF2 polypeptide has a length measured in total number of

amino acids, of at least 25% of the full length of an ORF2 polypeptide of SEQ ID NO:10, and is encoded by a polynucleotide having at least 90% sequence identity to SEQ ID NO.9, and wherein said ORF2 polypeptide increases lysine synthesis.

5. (Currently amended) The polynucleotide molecule of claim 4, wherein said polynucleotide molecule additionally comprises a P1 promoter element of SEQ ID NO: 15.

6. (Currently amended) The polynucleotide molecule of claim 5, wherein said P1 promoter element is adjacent to said nucleic acid encoding diaminopimelate decarboxylase.

7. (Previously presented) The polynucleotide molecule of claim 1, wherein said ask, asd and dihydrodipicolinate reductase polypeptides are encoded by genes from a cell of the genus *Corynebacterium*.

8. (Previously presented) The polynucleotide molecule of claim 1, wherein said ask and asd polypeptides are encoded by an ask/asd operon comprising a nucleotide sequence encoding two polypeptides one having ask activity and the other having asd activity, wherein said ask polypeptide is least 80% identical to SEQ ID NO:2 and said asd polypeptide is at least 80% identical to SEQ ID NO: 4 and wherein said nucleotide sequence encoding said ask polypeptide is at least 90% identical to SEQ ID NO: 1 and said nucleotide sequence encoding said asd polypeptide is at least 90% identical to SEQ ID NO: 3.

9. (Previously presented) The polynucleotide molecule of claim 2, wherein said ddh polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

10. (Previously presented) The polynucleotide molecule of claim 3, wherein said complete or truncated ORF2 polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

11. (Previously presented) The polynucleotide molecule of claim 4, wherein said diaminopimelate decarboxylase polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

12. (Previously presented) The polynucleotide molecule of claim 1, wherein said dihydrodipicolinate reductase polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 5.

13. (Previously presented) The polynucleotide molecule of claim 2, wherein said ddh polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 7.

14. (Cancelled).

15. (Previously presented) The polynucleotide molecule of claim 4, wherein said diaminopimelate decarboxylase polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 11.

16. (Original) A vector comprising the isolated polynucleotide molecule of claim 1.

17. (Currently Amended) A host cell comprising ~~said~~ the vector of claim 16.

18. (Currently Amended) The host cell of claim 17, wherein said host cell is a prokaryotic cell.

19. (Currently Amended) The host cell of claim 17, wherein ~~the~~ said host cell is a eukaryotic cell.

20. (Previously presented) The host cell of claim 17, wherein said host cell is a cell of the genus *Corynebacterium*.

21. (Original) The host cell of claim 17, wherein said host cell is an *Escherichia coli* cell.

22. (Original) A method for transforming a host cell comprising:

(a) transforming a host cell with the polynucleotide molecule of claim 1, wherein said isolated polynucleotide molecule is stably integrated into said host cell's chromosome; and

(b) selecting a transformed host cell.

23. (Original) A method for transforming a host cell comprising:

(a) transforming a host cell with the polynucleotide molecule of claim 1, wherein said isolated polynucleotide molecule is maintained in said host cell as extrachromosomal DNA; and

(b) selecting a transformed host cell.

24. (Withdrawn) A method of producing lysine comprising culturing said host cells of claim 17 in a culture medium, wherein said host cells produce lysine into said culture medium.

25. (Previously presented) The polynucleotide molecule of claim 1, wherein said polynucleotide molecule does not comprise a nucleic acid molecule encoding any of dihydrodipicolinate synthase, tetrahydrodipicolinate succinylase, N-succinylaminoketopimelate transaminase, N-succinyl-diaminopimelate desuccinylase or diaminopimelate epimerase polypeptides.

26. (Currently Amended) The polynucleotide molecule of claim 7, wherein said ~~bacterium~~ cell is *Corynebacterium glutamicum*.

27. (Currently Amended) The polynucleotide molecule of claim 9, wherein said ~~bacterium~~ cell is *Corynebacterium glutamicum*.

28. (Currently Amended) The polynucleotide molecule of claim 10, wherein said ~~bacterium~~ cell is *Corynebacterium glutamicum*.

29. (Currently Amended) The polynucleotide molecule of claim 11, wherein said ~~bacterium~~ cell is *Corynebacterium glutamicum*.

30. (Currently Amended) The polynucleotide molecule of claims 7, 9, 10, or 11 wherein said ~~bacterium~~ cell is selected from the group consisting of cells deposited as NRRL-B30236, and NRRL-B30237.

31. (Currently Amended) The host cell of claim 17 wherein said host cell is a ~~bacterium~~ of the genus *Brevibacterium*.

32. (Previously presented) The host cell of claim 31 wherein said host cell is *Brevibacterium flavum*.

33. (Previously presented) The host cell of claim 31 wherein said host cell is *Brevibacterium lactofermentum*.

34. (Currently Amended) The host cell of claim 31 wherein said host cell is a ~~bacterium~~ of the genus *Brevibacterium* selected from the group consisting of the cells deposited as NRRL-B30218, NRRL-B30219, NRRL-B30220, NRRL-B30221, NRRL-B30222, NRRL-B30234, NRRL-B30235, NRRL-B30410, NRRL-B30458, NRRL-B30459 and NRRL-B30522.

35. (Previously presented) The host cell of claim 20 wherein said host cell is selected from the group consisting of the cells deposited as NRRL-B30236, NRRL-B30237, NRRL-B30458, and NRRL-B30522.

36. (Previously presented) The host cell of claim 21 wherein said *E. coli* cell is deposited as NRRL-B30228.

37. (Currently Amended) ~~The vector of claim 16, wherein said vector comprises~~ The vector comprising the isolated polynucleotide of Claim 1 and a vector selected from the group consisting of pBR322, CoE1, PSC101, pACYC184, pi-VX, pET, pQE70, pQE60, pQE-9, pBs,

phagescript, pziX174, pBlueScript SK, pBsKS, pNH8a, pNH16a, pNH18a, pNH46a, pTrc99A, pKK223-3, and pKK233-3.

38. (Previously presented) The vector of claim 16 further comprising one or more control regions operably linked to said vector, said control region selected from one or more of the group of control regions consisting of inducer binding sites, repressor binding sites, and enhancers.

39. (Previously presented) The vector of Claim 16, wherein said vector is selected from the group consisting of pDElia2<sub>FC5</sub>-KDB, pK184-KDBH, pDElia2<sub>FC5</sub>-KDB2, and pDElia2<sub>FC5</sub>-KDB2HL.

40. (Withdrawn) Lysine produced by a host cell of claim 17.

41. (Withdrawn) A polynucleotide encoding an ORF2 polypeptide having thymidilate synthase or 2,3-dihydrodipicolinate N-C6-lyase activity, wherein said polynucleotide has at least 90% sequence identity to SEQ ID NO: 9.

42. (Withdrawn) An ORF2 polypeptide having thymidilate synthase or 2,3-dihydrodipicolinate N-C6-lyase activity and an amino acid sequence length of at least 25% of the amino acid sequence length of SEQ ID NO: 10.